

REMARKS

Claims 2-12 are pending. Claim 1 has been canceled. Claims 10 and 11 have been withdrawn from consideration as being drawn to nonelected subject matter.

Claims 2 and 3 have been amended to be in independent form.

Claims 5 and 10 have been amended so as not to depend from canceled claim 1. Claim 5 has also been amended to clarify that "M" can be at least one metal.

Support for the amendment to claim 6 can be found at paragraph [0024].

Claims 7-9 and 11 have been amended for clarity.

Support for the subject matter of claim 12 can be found in claim 5 and at paragraph [0024].

No new matter has been added by way of the above-amendment.

Election/Restriction

The Examiner has restricted the claims under 35 U.S.C. 121 into the following two (2) groups:

- I. Claims 1-9, drawn to a method of making a reflective reflector pattern, classified in class 427, subclass 58+; and

- II. Claims 10-11, drawn to a reflective reflector pattern, classified in class 428, subclass 1+.

Applicants affirm the election of group I, claims 1-9, drawn to a method of making a reflective reflector pattern. Applicants traverse the Restriction Requirement for the following reasons.

According to MPEP §803, if the search and examination of an entire application can be made without a serious burden, the Examiner *must* examine it on the merits, even though it includes claims to independent or distinct inventions. As evidence of the undue burden, the Examiner has listed that class 427/subclass 58+ is to be searched for Group I and class 428/subclass 1+ is to be searched for Group II. In view of: i) the likelihood that a significant portion of the patents belonging in class 427/subclass 58+ would also be classified in class 428/subclass 1+; and ii) the fact that the computer searching software used by the Examiner enables the Examiner to combine the search for patents in multiple subclasses without having to view duplicates, the search of the extra subclass(es) would not amount to an undue burden on the Examiner to consider all of claims 1-11. As such, Applicants respectfully request that the Examiner rejoins Group II with Group I.

Issues under 35 U.S.C. 112, First Paragraph

Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph for lacking enablement. Applicants respectfully traverse the rejection.

The Examiner has taken the position that while the present specification provides adequate enablement for the inventive process wherein the micropattern is formed in separate steps of coating, exposing and reducing as described in claims 2 and 3, the specification does not enable the skilled artisan to practice the inventive process wherein the micropattern is formed without specific description of steps.

In response, Applicants respectfully submit that the term “forming” in claim 1 is sufficiently enabled by the present specification. However, in order to advance prosecution, Applicants have amended claims 2 and 3 to be in independent form and have canceled claim 1.

In view of the fact that the specification provides sufficient enablement to the skilled artisan to practice the process defined in independent claims 2 and 3, withdrawal of the rejection is respectfully requested.

Issues under 35 U.S.C. 112, Second Paragraph

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph for being indefinite. Applicants respectfully traverse the rejection.

The Examiner objects to the term "forming" as appearing in claim 1 for being vague and indefinite. In response, Applicants have canceled claim 1 and have amended claims 2 and 3 to be in independent form. In claims 2 and 3, the forming step includes a coating step, exposing step and a reducing or oxidizing step. In claim 3, the forming step includes a step of preparing a pattern using soft lithography and/or ink jet printing and heating step to decompose the metal-containing compound. Accordingly, Applicants respectfully submit that the claims have been amended to sufficiently clarify the "forming" step.

The Examiner objects to the term "high" as appearing in the claims. In response, Applicants have amended the claims by deleting the term "high".

The Examiner objects to the term "soft" as used in connection with "soft" lithography" in claims 3 and 4. Applicants respectfully submit that the term "soft lithography" is art recognized. It includes such techniques as microcontact printing. Soft lithography methods, are described, for example, in Yan, et al., J. Amer. Chem. Soc., 120:6179-80 (1998); Xia, et al., Adv. Mater., 8(12):1015-17 (1996); Gorman, et al., Chem. Mater., 7:52-59 (1995); and Xia, et al., Angew. Chem. Int. Ed, 37:550-75 (1998). Another review article is Younan Xia & George Whitesides, "Soft lithography", in Annual Reviews of Material Science vol. 28, 1998, pp. 153-184, USA. Should the Examiner request, Applicants can provide the Examiner with one or more of the above-described articles describing "soft lithography". Furthermore, the present specification provides adequate guidance for performing soft lithography beginning at paragraph 0030. Accordingly, the term "soft lithography" is art recognized and does not render the presently claimed invention indefinite.

The Examiner objects to the phrase "M may be different from each other". The Examiner finds that it is confusing as to what the term is different from. In response, Applicants have amended claim 5 by replacing the phrase "M may be different from each other" with "each M may be different from the other". Similar changes have been made to the phrases concerning variables L and X in claim 5.

The Examiner objects to claim 5 for reciting that the organometallic compound can be represented by formula 1 wherein "n" can be 0. In other words, the formula 1 includes ionic compounds which are not classically defined as organometallic compounds. In response, Applicants have amended all of the claims containing the term "organometallic compounds" by replacing the term "organometallic compounds" with the term "metal-containing compounds".

The Examiner objects to the term "representative elemental metal" in claim 6. In response, Applicants have deleted this term from the claims.

The Examiner has objected to claims 7 and 8 asserting that it is unclear that all the terms recited in claim 7 are indeed ligands and that all the terms recited in claim 8 are indeed anions. In response, Applicants have amended claims 7 and 8 for clarity.

In view of the fact that the presently claimed invention particularly points out and distinctly claims the subject matter which Applicants regard as the invention, withdrawal of the rejection is respectfully requested.

Issues under 35 U.S.C. 102

The following rejections are pending:

A) Claims 1-4 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Chen et al. (5,989,653); and

B) Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Clarke et al. (4,869,930).

Applicants respectfully traverse the rejection.

In view of the fact that claim 1 has been canceled, Rejection **B)** is rendered moot. Nevertheless, Applicants now discuss the distinctions between the presently claimed invention and each of Chen et al. and Clarke et al. After careful consideration of the cited references, Applicants respectfully submit that all the characteristic features of the present invention are not disclosed in the cited references.

The present invention relates to a method for forming a reflective reflector micropattern, which features using metal-containing complex sensitive to UV or heat in forming a pattern of metal seed wires, and growing crystals by an electro or electroless plating process. In using the inventive metal-containing complex, a pattern can be formed easily by irradiating with UV light at a low temperature in a few minutes. Chen et al.(US5,989,653, hereinafter, "the cited reference (1)") relates to a process for additive metallization of a substrate by irradiative curing of a catalyst applied thereto. Clark et al.(US4,869,930, hereinafter, "the cited reference (2)") relates to a method of preparing substrates for deposition of metal seed from organometallic vapor for subsequent electroless metallization.

However, none of these cited references teach the method for forming a reflective reflector micropattern as is required in the present invention.

Furthermore, with regard to the cited reference (1), the cited reference (1) uses a catalyst solution comprising a carrier, a solvent, and catalyst ions. Catalyst ions such as palladium ions are dispersed in the catalyst solution. Besides, the coated substrate is irradiated with UV-light for more than three hours. The present process is distinct from the process of the cited reference (1), since the cited reference (1) does not disclose the metal-containing complex used in the present invention, and the step of reducing or oxidizing the exposed area to form a metal pattern or metal oxide pattern as is required (see inventive claim 2).

With regard to the cited reference (2), the cited reference (2) teaches forming active chemical sites adhering to the substrate surface. The substrate is then exposed to a vapor of a volatile organometallic compound for a time long enough for the organometallic compound to decompose into a species of its constituent metal by reacting with the chemically active site. That is, in order to obtain a metal pattern, a separate photoresist step is necessary wherein a volatile organometallic compound is used. However, the present invention does not use the chemical vapor deposition such as used in the cited reference (2). In addition, the metal-containing compound of the present invention is exposed to light only to an extent that the metal-containing compound at the exposed area is not dissolved in a solvent, thereby minimizing the exposure time and thus increasing productivity of the metal micropattern, and then the film is reduced or oxidized.

In describing the requirements for rejection of a claim by anticipation, the Manual of Patent Examining Procedure (Section 2131) states:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference (ref. omitted). The identical invention must be shown in as complete detail as is contained in the... claim (ref. omitted). "

Since all of the steps of independent claims 2 and 3 are neither taught nor suggested in the cited references (1) and (2), a *prima facie* case of anticipation cannot be said to exist and withdrawal of the rejections under 35 USC 102 is respectfully requested.

Issues Under 35 USC §103

The following rejections are pending:

- C) Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin, Nov. 1989 or Hill et al. (5,534,312) in combination with Chen et al. (5,989,653); and
- D) Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin, Nov. 1989 in combination with Chen et al. (5,989,653) further in combination with Clarke et al. (4,869,930).

Applicants respectfully traverse each of the rejections.

Applicants respectfully submit that the grounds for rejection under 35 USC §103 based on the cited references is unjustifiable because the characteristic features of the present invention are not disclosed in the cited references.

IBM Technical Disclosure Bulletin, Nov. 1989 (hereinafter, "the cited reference (3)") relates to a method for forming wiring patterns and vias with pure metal or metallic alloys on various substrates. The process of forming the wiring patterns and vias includes decomposing organometallic compounds by selective application of heat, e.g., by laser at relatively high temperature, approximately 500°C.

Hill et al. (US5,534,312, hereinafter, "the cited reference (4)") relates to a method of directly depositing metal containing patterned films.

However, the cited references (3) and (4) fail to teach or fairly suggest the step of reducing or oxidizing the exposed area and the step of growing crystals by an electroless plating process. Moreover, as indicated in the Office Action, the cited reference (3) in combination with the cited reference (1) fail to teach the claimed compositional make-up of the metal-containing compound.

As the MPEP directs, all the claim limitations must be taught or suggested by the prior art to establish a *prima facie* case of obviousness. See MPEP § 2143.03. Since all the limitations of claims 2-9 and 12 of the present invention are neither taught nor fairly suggested in the cited references (1) to (4), a *prima facie* case of obviousness cannot be said to exist. As such, withdrawal of the obviousness rejections under 35 USC 103 is respectfully requested.

Drawings

Applicants note that this application has been filed with three (3) sheets of drawings. However, the Examiner has not acknowledged for the drawings are acceptable. Applicants respectfully request in the next communication that the Examiner indicates whether the drawings are acceptable.

Priority Documents

Applicants respectfully request that the Examiner clarifies whether a certified copy of the priority document, Korean Application 2002-35988 has been received.

With the above remarks, Applicants believe that the claims, as they now stand, define patentable subject matter such that passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq. (Reg.

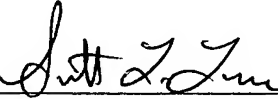
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No. 43,575) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

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Respectfully submitted,

By  #41,458

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